ART. XXVII.—*The West Riding Lunatic Asylum Medical Reports.* Edited by J. CRICHTON BROWNE, M.D., F.R.S.E. Vol. IV. 8vo. pp. 317. London: Smith, Elder & Co., 1874.

THE opening paper of the present volume is an address delivered by Dr. WM. B. CARPENTER, at a medical *conversazione*, held at the Asylum in November, 1873. Its subject is the *Physiological Import of Dr. Ferrier's Experimental Investigations into the Cerebral Functions.* The writer modestly deprecates criticism by the statement that for several years his time and attention have been largely occupied by official duties, and his leisure hours by studies other than physiological. The chief value of the address, we believe, is to be found in the endorsement which it gives to the claims and conclusions of Dr. Ferrier. The judgment of a physiologist so widely known and trusted as Dr. Carpenter is of no mean weight to the author or the reader who finds himself in almost untrodden fields.

Beginning with a condensed and lucid presentation of existing knowledge as to the structure and functions of different elements of the nervous system, the speaker describes a few typical experiments of Ferrier, and proceeds to set forth conclusions which he believes to be legitimately drawn from these.

The experiments themselves, he believes, were made with sufficient care, and repeated with such uniformity of result as to warrant their reception as thoroughly genuine and trustworthy. He agrees with Ferrier in believing that changes in the blood-supply are the constant and essential medium through which stimuli of all kinds act upon the brain. Increased function of any part implies and is consequent upon increased blood-circulation in that part.

Dr. Carpenter thinks that these experiments prove beyond a doubt the proposition that the cerebrum [cortical substance], like lower nerve-centres, has a reflex activity of its own. When irritation of a portion of cerebral surface causes, in an animal profoundly stupefied by chloroform, movements such as normally express emotion or intelligence, it does so through the same cerebral changes as, in a normal and conscious state, result from impressions received through the senses and reflected into expressive motion. In other words, increased blood-circulation in a certain convolution will surely produce motion of a certain definite and invariable character, whether due to impressions naturally conveyed and consciously received, or to artificial stimulus wholly unrecognized by consciousness. Much light is thrown by these experiments on what we call automatic action, and unconscious cerebration. This power of reflex activity, without consciousness, Dr. Carpenter illustrates by the case of the over-wearied parliamentary reporter, who, suddenly awakening from a brief oblivion, found to his surprise and pleasure that he had not ceased from noting the debate.

Dr. Ferrier's results confirm views long held by Carpenter, that the cortical ganglion does not exert its power directly upon the motor nerves themselves, but mediately through the motor centres at the base of the brain.

Much new light, too, is thrown upon the perplexing subject of "crossed action," by some of these experiments.

Dr. Carpenter does not perceive that any inferences as to the localization of different intellectual faculties, or mental states, can as yet be drawn from these investigations.

Taking as text and illustration a case of recovery from *double optic neuritis*, Dr. J. HUGHLINGS JACKSON earnestly advocates the invariable use of the ophthalmoscope in all cases of disease of the nervous system. Optic neuritis is one of the most important signs of intra-cranial disease. Unfortunately for the patient, however, a very severe degree of inflammatory action may arise, and continue for some time, without any failure of vision and without any symptom likely to direct attention to the eye. Extraordinary as it seems, in such forms of disease as are described and pictured by Dr. Jackson, affecting both eyes, he has not once only, but often, found perfect vision in the severest cases. Hence, if we neglect to examine the interior of the eyes, we are liable to miss for days or weeks the earliest and surest sign of intra-cranial disease, and to lose that precious period of early treatment which might save vision and life itself.

The case described was seen by Dr. Jackson some weeks after head-symptoms had begun. All indications pointed to some syphilitic growth or deposit within the cranium. The fundus of the eye was completely altered, with disk much enlarged, gray, and prominent. Yet the patient could read the smallest type, denied any trouble of vision, and had no febrile action. Perfect recovery, from the neuritis and from the other symptoms, followed a course of iodide of potassium.

The writer argues with great cogency that if we wait for symptoms of neuritis to appear, the mischief already done may probably be irreparable. If in all head affections we inspect the posterior chamber we may sustain or correct our diagnosis; and possibly detect, in time for treatment, a symptom which would become of itself a very grave disease. The case is a most instructive one, and fully justifies the lessons drawn from it.

Dr. FERRIER contributes a valuable paper upon *Pathological Illustrations of Brain Function*. From the case-books of the Asylum he quotes the records of some half-dozen fatal cases of cerebral disease in which autopsies were had. Brief comments are then made to show the connection between the symptoms during life and the localized lesions found after death. Some epileptic cases support his conclusions, drawn from experiments upon brutes, as to the convulsions having their origin in the superficial portions of the hemispheres.

The writer takes occasion here to defend his observations from the attacks of those who deny the possibility of localizing and limiting the electric irritation of the brain. He shows very conclusively, we think, that such irritation can be, and has been sufficiently circumscribed for all practical purposes. Some pains are taken also to explain the sense in which he has used the words "motor centres" in relation to portions of cortical substance. In this part of the brain, a motor centre is a source whence issues a mandate which calls into orderly activity the lower ganglia to effect some definite movement.

One of the cases having included aphasia among its symptoms and presented extensive disease of the left anterior hemisphere, gives rise to some very thoughtful and discriminating remarks. That the power of using words should depend upon the integrity of the left rather than of the right speech-centre Dr. Ferrier attributes to the force of habit, education, and those other occult causes which make us right-handed or left-handed. This theory would of course account for the occasional reversals of the rule, and for partial recovery in some cases. Provided the faculties in general are not weakened, the formerly inactive centre upon the right side may gradually learn to do the work which the greater aptness of its fellow had monopolized before becoming diseased.

As to the exact site of the speech-centre, Dr. Ferrier's experiments and researches have led him to fix upon the *operculum*, just over the island of Reil.

*The Urinology of General Paralysis* is the title of an article by Dr. JOHN MERSON, one of the Asylum staff. It gives the results of observations upon the urine of twenty-one general paralytics, together with parallel examinations upon the excretion of six healthy attendants, subjected to similar conditions. The researches seem to have been conducted with extraordinary care and the minutest attention to every detail which might affect the uniformity of conditions and the accuracy of results. That these results are not apparently very remarkable, or practically suggestive, is no fault of the industrious and conscientious observer. In each case—with some indicated exceptions—all the urine of three successive days was examined. In twelve of the cases the patients were then put upon the use of Calabar bean, and the analyses were repeated. Three were put upon alcohol, and the examinations again made.

The results as stated by Dr. Merson are these: 1. Urea varies above and below the average of health; in most cases considerably increased. 2. Chlorides and phosphoric acid notably diminished; sulphuric acid about normal. 3. Specific gravity varies within wider limits than in health; mean not materially different. 4. Absolute quantity a little less than in the six healthy men, but, allowing for weight, a little in excess. 5. Calabar bean diminishes all solid constituents considerably, especially urea. 6. In the three cases treated with alcohol, both amount of urine and of solid constituents, especially of urea, were diminished.

Dr. J. MILNER FOTHERGILL has prepared an elaborate article on *Cerebral Anœmia*. It is an admirable monograph, and will richly reward perusal. We despair of being able to present here anything more than the skeleton of it.

In showing the possibility of variation in amount of blood within the cranium, much importance is attached to the recently discovered peri-vascular canals or spaces.

The conditions and causes of cerebral anæmia are stated as: general anæmia, spanæmia, unfilled vessels, heart-disease, pressure on vessels, embolism, venous stasis, apoplexy, gouty spasm, organic disease involving vessels, vaso-motor disturbance, and lastly, medicinal agents. The mode in which each of these antecedents acts is exhibited with great clearness. The criticism might be made, however, that two or three of these conditions are not strictly deficiency of blood, though practically equivalent in effect.

For diagnostic purposes, the writer divides cerebral anæmia into acute and chronic. Among the marks of the latter condition he notes the dilated pupil, pallor of face, and the dead-white, dull eye, uniformly diffused grayish tint of both optic disks, usually feeble heart-action, with small and compressible pulse, coldness and often lividity of hands and feet, and many other manifestations of an ill-nourished system. The conjunction of diurnal drowsiness and nocturnal vigilance is noted, and its postural explanation guardedly admitted. Dull headache, constant at the vertex, is mentioned as of much diagnostic import. Intestinal torpor and fulness may be either cause or consequence of the anæmia.

Mental inactivity or weakness, with perhaps occasional periods of irritability; loss of power for continued thought; depression of spirits, are the principal psychical symptoms of deficient blood in the brain. These soon pass, if the case persists, into melancholia, with or without delusions or hallucinations, and end in dementia.

A distressing and not uncommon consequence of cerebral anæmia, Dr. Fothergill believes to be the resistless craving for stimulants met with in debilitated and bloodless women. Religious anxieties and delusions are also often due to the same condition.

The anæmia may be partial or local. As different parts of the brain are chiefly supplied by different arterial trunks, pressure, obstruction, or other causes may act upon one and not upon all. Profound depression of spirits, with entire clearness and strength of intellect, is referred to as probably a result of such a condition. The writer lays considerable stress upon the especially close nerve-connection which exists between the liver and the posterior lobes of the cerebrum. The vaso-motor nerves of the latter locality are principally supplied from the inferior cervical ganglion of the sympathetic; and this ganglion is in peculiarly close relations with the vaso-motor system of the liver. In consequence of this connection, irritations of the nerve-fibres in the latter organ are communicated to those which by governing the vertebral arteries control the amount of blood sent to the posterior cerebrum. This portion of the brain is believed to be the chief emotional centre, according to Schroeder v. d. Kolk and Laycock. The other parts of the cerebrum are supplied by other arteries, controlled by vaso-motor fibres from other ganglia.

The latter pages of this essay are occupied with prognosis, and with judicious suggestions as to treatment.

Dr. William T. Benham, Pathologist and Assistant Medical Officer of the Asylum, presents the results of some most ingenious experiments, made to ascertain the *Therapeutic Value of Cold to the Head.* The results are certainly rather startling. It is pretty conclusively shown that ice-bags to the shaven scalp produce a slight cooling of the brain by reflex action (none by direct conduction); a slight diminution of bodily temperature generally, and a slight decrease in the frequency of the pulse; but that these effects are "*so insignificant in degree and temporary in duration,*" as following any safe continuance of treatment, as not to warrant the trouble and discomfort which attend upon the application.

Ice to the head does undoubtedly lessen the amount of blood passing through the vessels of the scalp; but must thereby increase the vascularity elsewhere. The writer queries whether diminishing the calibre of the terminal branches of the external carotid may not produce increased blood-pressure in the ramifications of the internal carotid.

The reactionary effect which follows the intense action of cold on the peripheral nerves must also be remembered.

Such sedative influence as is often undoubtedly exerted by cold applications to the head must be through the nervous rather than the vascular system. The method of its action is imperfectly understood.

T. Lauder Brunton, M.D., contributes a thoughtful article upon *Inhibition, Peripheral and Central.* Throughout the human organization the power to check and control is no less important than the ability to excite. Any manifestation of the former, whether in the physical, mental, or emotional nature, may be considered a form of inhibitory action. The writer, therefore, does not confine himself to the influence of certain nerves, in removing the contraction of bloodvessels, or in neutralizing the action of certain ganglia, but considers the subject in its broadest aspect and its different phases.

While the paper is well adapted to enlarge our views of the scope and function of this special form of nervous activity, we cannot say that we find this very obscure and difficult subject treated here with entire clearness. But even if our judgment upon this point be correct, the effort is a very able and commendable one.

Dr Herbert C. Major, of the Asylum staff, and a frequent contributor of valuable articles to former volumes, presents some *Observations on the Histology of the Morbid Brain.* The cases here examined were those in which senile atrophy had occurred. No change strictly pathognomonic was discovered. Certain pathological alterations will be pretty uniformly found in the cortical substance in these cases; but very similar ones may be observed in other forms of cerebral disease. That particular lesions of the brain-substance will ever be found to mark and differentiate each variety of brain-disease, Dr. Major very justly doubts.

The nerve-cells of the frontal and parietal regions are the ones most affected. These are found pretty uniformly changed throughout the whole depth of the gray matter. It is perhaps in the large, pyramidal cells, midway through the cortical substance, that the changes are most marked and constant. The layers or rows of small, round cells, are modified to a less extent. The number of these last, however, is often found much diminished.

The greatest and most constant lesion is a granular degeneration of the large cells. The great pyramidal cells first lose their distinct and more or less triangular outline, and appear swollen or inflated. The long processes are generally lost or diminished in number. The nucleus also loses its angularity, and becomes swollen and rounded. As the disease progresses a granular deposit appears, within the cells, or without, or both. Soon the swollen cells break down, leaving each a sort of hole or gap containing a nucleus and granules. Later the granules often disappear, leaving the nucleus alone. This body itself, though longest lived, usually passes through a rounded and swollen, to a granular condition.

The appearances described, and those of the same structures in health, are admirably shown by plates.

Note is made of the exceptional appearance and the histological importance of hypertrophied or "giant" cells. The regularity of arrangement of brain cells in rows or layers, is much disturbed in advanced atrophy. The capillaries are dilated, and present minute granules and crystals of hæmatin deposited on their walls, especially at bifurcations. The peri-vascular spaces are enlarged. The fibres of the gray matter become coarser than is normal, and very crooked and irregular. The neuroglia becomes atrophied and finally broken down into molecular *débris*. Its corpuscles are somewhat increased in number, and at the last become shrivelled and atrophied.

The conscientious care with which Dr. Major shuns hasty conclusions or unwarranted inferences cannot be too highly commended.

An essay by Dr. ROBERT LAWSON, of the Asylum staff, upon the *Hourly Distribution of Mortality*, contains much curious information. Patients prostrated by chronic disease are in greatest danger of death during the early morning hours. Especially, then, should we aim to support them at this period. Acute diseases have their periods of exacerbation, in addition to the physiological depression of the early morning, both of which should be remembered in treatment.

Dr. BROWNE, editor of these Reports and Chief Officer of the Asylum, gives us a graphic picture of *Acute Dementia.* Commonly a disease of youth, and perhaps more frequent in females than males, the writer believes it usually unconnected with hereditary weakness. Physical debility or exhaustion, with a life of monotony and mental inactivity, are the combined circumstances credited with its causation. Masturbation is believed by Dr. Browne sometimes to produce it. It not unfrequently occurs as a sequel to typhoid fever, and other exhausting maladies.

The onset of the disease may be very gradual, or it may be sudden with transient excitement. The description of its phenomena, not being especially novel, calls for no comment.

The reality of the disease, and its difference from atonic melancholia, are insisted upon.

The writer believes, though upon very little presented evidence, that atony and venous accumulation affecting the vessels of the pia mater, is the physical condition of this mental malady. The disease being eminently curable, and never causing death while still acute, certainty as to the cerebral state is difficult to attain.

Practical hints as to treatment are very good.

As if to strengthen the previous paper in its weak point, there follows an article by Dr. Chas. Aldridge giving the results of *Ophthalmoscopic Observations in Acute Dementia*. Dr. A. will be remembered as a reporter of much good work with his favourite instrument, in previous volumes. Owing to the comparative rarity of typical cases of this form of disease, the results of only about fourteen examinations are given. In these anæmia of the optic disks was uniformly observed. Both disks are equally affected with evenly diffused grayish pallor. The retinal vessels are small and shrunken, but not tortuous. In these two points the appearances differ from those of atrophy, in which the pallor is a dead white in spots, but not evenly diffused, and the vessels are often somewhat tortuous. In very extreme cases œdema was sometimes present. This condition gradually disappeared with convalescence.

Dr. Aldridge argues that known analogies indicate that the bloodless state of the disks affords a pretty correct index to that of the cerebral convolutions.

With the cases of acute dementia are reported two of atonic melancholia, in which also some degree of anæmia existed.

A second paper by Dr. Benham treats of the *Actions of Nicotine*. Experiments upon small animals indicate that this drug does not kill by arresting the heart's action. On the contrary, it seems to act as a powerful stimulant to that organ. Poisonous doses probably kill by rendering respiration more and more shallow. Nicotine seems to affect the heart both through direct stimulation of its intrinsic nerve-centres, and through its power of arresting the inhibitory functions of the vagi. These properties seem to indicate that it should possess therapeutic value.

Applied to the conjunctiva or given internally, it causes prompt but transient contraction of the pupil. In a few experiments upon the effects of the drug taken into the human stomach it was found that small doses—as $\frac{1}{20}$ of a minim—increased the frequency of the pulse; but that $\frac{1}{5}$ of a minim diminished the rate decidedly. The cardiac impulse as measured by the sphygmograph was not diminished by small doses; and in two cases was clearly increased. Thus instead of the powerful depressant it has been deemed, nicotine in small doses would seem to be a gentle stimulant and invigorant. B. L. R.

## Art. XXVIII.—*Sixth Annual Report of the State Board of Health of Massachusetts.* 8vo. pp. 379. Boston, January 1, 1875.

The current number of this most valuable series opens with a touching tribute, from the pen of Dr. Henry I. Bowditch, to the noble character and eminent usefulness of *Dr. George Derby*, late secretary of the Board. The duties of his highly honourable and responsible position were performed from the organization of the Board in 1869, till his death in June, 1874, in a manner equally remarkable for ability and for conscientiousness. Fortunate is the State that possesses such citizens, and that is wise enough to secure their services for the public good.